We Claim:

1. A method of determining the service life of a cyclic system comprising the steps of:

determining at least one characteristic of the system to determine a characteristic value;

determining a cycle time of the system;

applying the at least one characteristic value to an algorithm in which the characteristic value is integrated to determine a diagnostic value; and

comparing the diagnostic value to a predetermined value to determine the operational status of the system.

2. The method as defined in Claim 1, wherein the characteristic value is flow rate Q.

3. The method as defined in Claim 2, wherein the algorithm to determine the status of the system is

$$K = \int_0^T Q dt$$

wherein Q is a flow rate, T is the cycle time and K is the diagnostic value.

4. The method as defined in Claim 2, further including the step of providing a flow sensor for determining the flow value.

5. The method as defined in Claim 1, further including the step of providing a PLC for determining the cycle time T.

6. The method as defined in Claim 1, further including the step of displaying diagnostic information to a user.

7. The method as defined in Claim 1, further including the steps of

evaluating the diagnostic value over a plurality of system cycles to determine a change in the diagnostic value;

evaluating the cycle time over a plurality of system cycles to determine a change in the cycle time;

comparing the change in diagnostic value to the change in the cycle time to determine the operational status of the system.

8. The method as defined in Claim 3, further comprising the step of differentiating the flow rate Q with respect to time, dQ/dt, to determine a start and stop time of a movement of an actuator.

9. The method as defined in Claim 3, further comprising the step of determining a time period for integration by differentiating the flow.

10. The method as defined in Claim 3, wherein the flow rate is integrated over a time period defined by a start and stop time of a movement of an actuator.

11. The method as defined in Claim 3, wherein the system includes a fluid power valve operatively connected to a piston driven cylinder and further comprising the step of integrating the flow rate Q over the time period defined by an actuation of the valve and a return of the piston to an initial position.

12. The method as defined in Claim 3, further comprising the step of determining the time period T from a movement of a device in the system and integrating the flow over the time period T.

13. The method as defined in Claim 3, further comprising the step of integrating the flow rate Q over the time period T, wherein T equals the time for one complete cycle of the system.

14. A method of determining the service life of a cyclic fluid power system comprising the steps of:

determining a flow rate of the fluid power system;

determining a cycle time of the system;

integrating the flow rate over the cycle time to determine a diagnostic value; and

comparing the diagnostic value to a predetermined value to determine the operational status of the system.

15. The method as defined in Claim 14 further comprising the steps of storing the diagnostic value calculated at a first time period T_1 and comparing the diagnostic value at T_1 to the diagnostic value calculated at a second time period T_2 to determine a diagnostic value delta, ΔK.

16. The method as defined in Claim 15 further comprising the step of calculating a change in cycle time between T_1 and T_2 to obtain a cycle time delta, ΔT.

17. The method as defined in Claim 16 further comprising the step of comparing the diagnostic value delta ΔK to the cycle time delta ΔT to determine a system operational status.

18. A method of determining the service life of a cyclic system comprising the steps of:

sensing a characteristic of the system to determine a characteristic value;

applying the characteristic value to a first algorithm to determine a beginning T_1 and an end T_2 of a cycle;

subjecting the characteristic value to a second algorithm calculated over T_1 and T_2 to determine a diagnostic value K; and

comparing the diagnostic value to a set of known values to determine the performance status of the system.

19. The method as defined in Claim 18 wherein the characteristic value is a flow rate Q, and said first algorithm is dQ/dt and said second algorithm is $K = \int_{T1}^{T2} Q dt$.

20. An apparatus for determining an operational status a cyclic fluid power system comprising:

a sensor for sensing a system characteristic;

a calculating unit operatively connected to the sensor, the calculating unit including circuitry for performing a mathematical integration on the system characteristic to determine a diagnostic value and comparing the diagnostic value to a predetermined value to determine the performance status of the system; and

a notification device operatively connected to the calculating unit for indicating the operational status of the system.

21. The apparatus as defined in Claim 20, wherein the system characteristic is a flow rate.

22. The apparatus as defined in Claim 21, wherein the calculating unit determines the diagnostic value only based upon the flow rate signal.

23. The apparatus as defined in Claim 21, wherein the circuitry of the calculation unit includes a processor for integrating the system characteristic over time.

24. The apparatus as defined in Claim 23, wherein the processor is configured to differentiate the system characteristic to determine the values over which the integration of the system characteristic takes place.

25. The apparatus as defined in Claim 23, wherein the calculating unit is operatively connected to a control device, said control device generating information on the cycle time and the processor using the cycle time information to perform the integration of the system characteristic.

26. The apparatus as defined in Claim 25, wherein the processor compares the calculated diagnostic value to the predetermined value and generates a notification displayed by the notification device.

27. A cyclic fluid power system having an operational status monitor comprising:

a valve in fluid communication with a fluid source;

an actuator operatively connected to the valve;

a sensor for determining a system characteristic;

a calculating unit operatively connected to the sensor, the calculating unit including circuitry for performing a mathematical integration on the system characteristic to determine a diagnostic value and comparing the diagnostic value to a predetermined value to determine the performance status of the system; and

a notification device operatively connected to the calculating unit for indicating the operational status of the system.

28. The fluid power system as defined in Claim 26, wherein the mathematical integration to determine the status of the system is

$$K = \int_0^T Q dt$$

wherein Q is the flow rate, T is the cycle time and K is the diagnostic value.

29. The fluid power system as defined in Claim 28, wherein the actuator includes a drive component movable from an initial position to an actuated position and back to the initial position, and wherein T equals the time period defined by an actuation of the valve and a return of the actuator to an initial position.

30. The fluid power system as defined in Claim 28, wherein the actuator includes a drive component movable from an initial position to an actuated position and wherein T equals the time period from when the drive component moves from the initial position to the actuated position.